

REMARKS

Claims 1, 3-13, and 15-23 are pending in the application. Claims 1, 3-13, and 15-23 have been rejected and are currently under consideration. Claims 12 and 23 are amended with this paper.

Reconsideration and allowance are respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 12 and 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wasserman (U.S. Patent No. 5,260,779) in view of Magro (U.S. Patent No. 6,260,081).

The Examiner states, in part:

Wasserman discloses the use of multiple cameras with multiple storage units corresponding to each camera (fig. 2). Although Wasserman does not specifically disclose wherein each of the plurality of channels correspond to a DMA channel, however, Magro teaches the use of a DMA controller with a plurality of DMA channels that can be accessed (see fig. 2 and col. 4, ln. 61 to col. 5, ln. 65; peripherals such as cameras and other devices can be accessed by connecting to a DMA controller through plural DMA channels). Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Wasserman and Magro, as a whole, for freeing up the computer processor to execute and perform other tasks so as to speed up the overall computer operation (Magro col. 3, ln. 1-7).

(Emphasis added.)

Applicants traverse the Examiner's rejection and respectfully submit that the Examiner is engaging in impermissible hindsight reconstruction using the Applicants' claims as a guide. As described in MPEP § 2143, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991).

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of

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ordinary skill in the art. In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998) The level of skill in the art cannot be relied upon to provide the suggestion to combine references. Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308 (Fed. Cir. 1999). In addition, MPEP § 2143.01 states: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)".

Applicants respectfully traverse the Examiner's statements regarding the teachings of Magro. Magro does not teach that "peripherals such as cameras and other devices can be accessed by connecting to a DMA controller through plural DMA channels". Magro does not include any reference to cameras. Magro describes, in part:

Peripheral devices which commonly use DMA channels include DRAM (dynamic random access memory) refresh circuitry, sound cards, SCSI host adapters, parallel ports, tape cards, network cards, modems, and floppy disk controllers. (Col. 2, lines 28-32.)

The Examiner has not cited any evidence of a motivation to combine the references other than the Examiner's own conclusory statements applied in hindsight. "Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight." In re Dembiczak, 175 F.3d at 999 (Fed. Cir. 1999).

Wasserman teaches the use of conventional processing techniques:

Once acquired, the video images are stored and processed making use of techniques which substantially correspond to those previously employed by existing printed circuit board inspection devices. (Col. 3, lines 11-14.)

The video outputs 21, 22, 23, 24 in turn communicate with a series of frame storage units 25, 26, 27, 28 which operate to receive and temporarily store the video signals for subsequent processing. To this end, the frame storage units 25, 26, 27, 28 communicate with central processing units 29, 30 via an information buss 31. Resulting from this, images acquired by the cameras 13, 14, 15, 16, and stored within the frame storage units 25, 26,

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27, 28, can be selectively accessed and processed by the central processing units 29, 30, as desired. Means for implementing these structural components, and for processing the information which is acquired, are known from prior circuit board inspection devices which employ similar structural components and processing techniques. Accordingly, further detail regarding these components is unnecessary to a full understanding of the present invention, other than to describe the interaction of such components with the improvements of the present invention. (Col. 3, line 55 to col. 4, line 5; emphasis added.)

The combination of claimed elements can provide advantages not appreciated by the cited references. In particular, the specification describes some benefits that may be obtained with some embodiments of the present invention:

This arrangement provides a significant advantage over conventional systems that read image data from local memories on framegrabber boards, i.e., non-direct access. In this prior art approach, image data gets overwritten or flushed as soon as the camera transmits another frame. This image data must then be later re-acquired by sending the camera back to the point on the board to recapture the data corresponding to the lost image data. (Page 14, lines 5-10.)

As described above, there is no teaching or technological motivation provided in either reference to form the combination proposed by the Examiner. Moreover, embodiments of the claimed invention provide advantages not contemplated by either of the references. Consequently, the proposed combination of references is unsupported and inappropriate. Applicants respectfully request that the Examiner withdraw the rejection under 35 U.S.C. § 103 of claims 12 and 15-16, which depend from claim 12.

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Wasserman and Magro, as applied to claim 12 above, and further in view of Buckley (U.S. Patent No. 6,064,759). The Examiner states, in part:

Wasserman and Magro are silent about the capturing of data associated with the plurality of lighting modes in a single pass. However, Buckley teaches the capturing of image data associated with the plurality of lighting

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modes in a single pass (see fig. 5 and col. 4, ln. 36-38 and col. 14, ln. 58-67, Buckley discloses that there can be multiple light sources, or lighting modes, that can be applied all in one single pass to capture the image data of the object or item to be inspected). Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Wasserman, Magro and Buckley, as a whole, for accurately capturing all of the necessary image data for analysis in a fast, expedient manner (Buckley col. 3, ln. 30-35).

Applicants respectfully traverse the Examiner's rejection of claim 13.

Claim 13 depends from claim 12. As described above, the rejection of claim 12 in view of Wasserman and Magro is improper. Buckley fails to cure the deficiencies of Wasserman and Magro with respect to claim 12. Accordingly, the rejection of claim 13 is improper and should be withdrawn.

In addition, claim 13 recites:

The system according to claim 12, wherein the optical inspection system is adapted to image a first location on the object with a first one of the plurality of cameras in first and second ones of the plurality of lighting modes in a single pass over the first location. (Emphasis added.)

In contrast, Buckley describes, in part:

FIG. 5 is a simplified isometric view of a system having multiple camera/light source sensors for inspecting all sides of an object in a single pass. (Col. 4, lines 36-38.)

FIG. 5 illustrates a 6-sensor machine 40 with each sensor 41 having its own structured light source and camera. As in FIG. 1, a laser line source is the preferred embodiment of the structured light source, but other light sources, such as diffuse or Moire, could also be used. (Col. 14, lines 58-67; emphasis added.)

Six sensors 41 image six different faces of object 44: sensor 41a the top face, sensor 41b the bottom face, sensor 41c the front face, sensor 41d the rear face, sensor 41e the left side face and sensor 41f the right side face. Each sensor has an associated laser line structured light source 42 and camera (not shown). Note that plate 46 has an opening 47 through which sensor 41b can illuminate and image the bottom face of object 44; clamps 43 are also designed to neither obstruct illumination nor image of the bottom face. It is further noted that sensors 41c and 41d are above the plane of the top face of object 44 so that object 44 has an unobstructed path past all the six sensors 41. (Col. 15, lines 5-17; emphasis added.)

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Buckley teaches that the images from a plurality of cameras can be used to inspect multiple sides of an object in a single pass. However, Buckley does not teach the use of a single camera to image a first location on an object in two different lighting modes in a single pass, as recited in claim 13.

For at least these reasons, the cited references fail to establish a *prima facie* case of obviousness of claim 13. Applicants respectfully request withdrawal of the Examiner's rejection of claim 13 and allowance therefor.

Claims 1, 9-10, 17-18, and 22-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuyts (EP 0772381 A1) and Wasserman in view of Buckley.

The Examiner states, in part:

Wuyts and Wasserman do not specifically disclose the capturing of data associated with the plurality of lighting modes in a single pass. However, Buckley teaches the capturing of image data associated with the plurality of lighting modes in a single pass (see fig. 5 and col. 4, ln. 36-38 and col. 14, ln. 58-67, Buckley discloses that there can be multiple light sources, or lighting modes, that can be applied all in one single pass to capture the image data of the object or item to be inspected). Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Wuyts, Wasserman and Buckley, as a whole, for accurately capturing all of the necessary image data for analysis in a fast, expedient manner (Buckley col. 3, ln. 30-35).

Applicants respectfully traverse the Examiner's rejection.

Claim 1 recites, in part:

wherein the plurality of cameras are adapted to obtain image data of the object based upon a plurality of fields of view of the object and a series of firing positions within each field of view, each of the firing positions having associated therewith at least one of the plurality of cameras and at least one of the plurality of lighting modes provided by the illumination system, wherein the optical image system is adapted to image a first one of the plurality of fields of view of the object with the at least one of the

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plurality of cameras in first and second ones of the plurality of lighting modes in a single pass. (Emphasis added.)

As described above with respect to claim 13, neither Wasserman nor Buckley teach or suggest that “the optical image system is adapted to image a first one of the plurality of fields of view of the object with the at least one of the plurality of cameras in first and second ones of the plurality of lighting modes in a single pass”, as recited in claim 1. Wuyts fails to cure the deficiencies of Wasserman and Buckley.

For at least these reasons, the cited references fail to establish a *prima facie* case of obviousness of claim 1 and claims 9-10, which depend from claim 1. Applicants respectfully request withdrawal of the Examiner’s rejection of claims 1 and 9-10 and allowance therefor.

Claim 17 recites, in part:

for each of the plurality of firing positions, selecting at least one of a plurality of asynchronously triggerable cameras and at least one of a plurality of lighting modes, wherein the optical inspection system is adapted to image a first location on the circuit board with the at least one of the plurality of cameras in first and second ones of the plurality of lighting modes in a single pass (Emphasis added.)

For at least the reasons given above with respect to claims 1 and 13, the cited references fail to establish a *prima facie* case of obviousness of claim 17 and claims 18 and 22, which depend from claim 17. Applicants respectfully request withdrawal of the Examiner’s rejection of claims 17-18 and 22 and allowance therefor.

Claim 23 recites, in part:

for each of the plurality of firing positions, selecting at least one of a plurality of asynchronously triggerable cameras and at least one of a plurality of lighting modes, wherein the method of manufacturing is adapted to image a first location on the circuit board with the at least one of

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the plurality of cameras in first and second ones of the plurality of lighting modes in a single pass, and (Emphasis added.)

For at least the reasons given above with respect to claims 1 and 13, the cited references fail to establish a *prima facie* case of obviousness of claim 23. Applicants respectfully request withdrawal of the Examiner's rejection of claim 23 and allowance therefor.

Claims 3-4, 7-8, 11, and 19-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuyts, Wasserman, and Buckley as applied to claims 1 and 17 above, and further in view of Magro. Applicants respectfully traverse.

Claims 3-4, 7-8, and 11 depend from claim 1, and claims 19-21 depend from claim 17. As described above, Wuyts, Wasserman, and Buckley fail to establish a *prima facie* case of obviousness of claims 1 and 17, and Magro fails to cure the deficiencies of Wuyts, Wasserman, and Buckley. Accordingly, the cited references fail to establish a *prima facie* case of obviousness of claims 3-4, 7-8, and 11. Applicants respectfully request withdrawal of the Examiner's rejection of claims 3-4, 7-8, and 11 and allowance therefor.

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CONCLUSION

In light of the foregoing, Applicant respectfully requests that the rejections be withdrawn and the claims allowed. Should any other action be contemplated by the Examiner, it is respectfully requested that he contacts the undersigned at (408) 392-9250 to discuss the application.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicant(s) petition(s) for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or fees due in connection with this document to Deposit Account No. 50-2257 referencing docket no. M-15703 US.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 5, 2005.

H. Matsubayshi Jan 5, 2005
Attorney for Applicant(s) Date of Signature

Respectfully submitted,

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